REMARKS

Claims 1-33 were pending. All were rejected. By the amendments above, the applicants have amended claims 1, 6-8, 23, 24, 28-30 and 33. The applicants have also amended the specification at page 3. The applicants request further consideration and re-examination in view of the amendments above and remarks below.

Objection to the Drawings:

The drawings are objected to on the grounds that they do not include the reference signs "204A.. 204J" mentioned in the written description. The applicants have amended the specification at page 3 to replace the reference signs "204A.. 204J" with reference signs "104A.. 104J" used in Figure 1. Therefore, reference signs "204A.. 204J" no longer appear in the specification. In view of this amendment, the applicants respectfully request that the objection to the drawings be removed.

Objection to the Claims:

Claims 7 and 29 are objected to on the grounds that "the center of gravity" should be changed to "a center of gravity." The applicants have amended claims 7 and 29 accordingly. In view of this amendment, the applicants respectfully request that the objection to the claims be removed.

Rejections under 35 U.S.C. § 103:

Claims 1-13, 16-19, 23-30 and 33 were rejected under 35 U.S.C. § 103 in view of U.S. Patent No. 5,850,539 to Cook et al. (hereinafter, "Cook") in view of Kolen at al., "A Low-Cost, High-Density Mounting System for Computer Clusters" (hereinafter "Kolen"). Claims 14, 15, 20-22, 31 and 32 are rejected in view of Cook and Kolen and further in view of U.S. Patent No. 6,086,617 to Waldon et al. (hereinafter "Waldon").

The applicants have amended the claims by the above amendments to better clarify the distinctions between the applicants claims and the cited references. Particularly, claim 1 is amended to recite as follows:

1. (Currently Amended) A method of determining placement of components in a rack comprising the steps of:

providing input variables comprising a rack height, an identification of a set of components, a weight and a height for each component in the set of components;

determining a placement of the components in the rack according to constraints by solving an optimization problem using a computer, the optimization problem using the rack height, the identification of the set of components, the height and weight for each component and the constraints; and

evaluating the placement of the components according to at least one objective comprising at least a center of gravity objective.

Therefore, claim 1 requires the use of a computer to solve an optimization problem. This limitation is supported by the applicants' specification at least at page 3, line 26, to page 4, line 2 and page 4, lines 12-18, where it explains use of a computer to implement the determining and evaluating steps using mixed integer programming to find an optimal or near-optimal problem solution. Moreover, the solution takes into account the height and weight of each component and evaluates the placement against a center of gravity objective. This limitation is supported by the applicants' specification at least at page 3, line 9, to page 4, line 11. Claims 6-8, 24, 28-30 and 33 are amended to be more consistent with the amendments to claim 1. No new matter has been entered.

Cook describes a system for facilitating creation of a rack-mountable component personal computer. Cook at col. 3, lines 12-13. The system presents an interface for allowing a user to select the components the user desires to place into a rack-mountable computer. Cook at col. 3, lines 41-44. A graphical representation is displayed showing a mounting rack containing the chosen computer components. Cook at col. 3, lines 61-67 and Figures 1-19. Cook teaches that placement of the components in the rack is governed by placement rules which are automatically enforced by an auto-arrange function or which must be strictly followed if the rack is constructed manually. Cook at col. 7, lines 31-35 and 62-63. The component placement rules begin with the requirement that all

components are sorted by weight with the heaviest relegated to the bottom of the rack. Cook at col. 7, lines 38-40. Other rules are applied, for example, a keyboard/monitor/mouse switch box must be placed above the keyboard. Cook at col. 7, lines 41-43. Components are repeatedly selected and the placement rules applied until the all of the components are loaded into the rack. Cook at col. 8, lines 39-45. The system then checks for occurrences of incompatibility among the components and issues a warning to the user when there is an incompatibility. Cook at col. 12, lines 45-53. For example, the user is warned if the power supply is inadequate or if the configuration is missing certain components, such as a monitor or a keyboard. Cook at col. 13, lines 18-43.

Kolen describes a mounting system for computer clusters which can be built inexpensively using materials "available at any hardware/lumber store." Kolen at page 157. The mounting system uses a wooden frame on wheels and standard, wall-mounted shelving hardware attached to the frame to support motherboards. Kolen at page 158. This mounting system was designed under constraints that the construction be simple and inexpensive, that it accommodate a large number of processors, that it provide easy access to the processing units and that it be mobile. Kolen at page 157. The design also needed to be "eye-catching" so as to impress visitors with "[b]linking LEDs, exposed hardware and lots of cables…". Kolen at page 158.

Neither Cook, nor Kolen, teaches or suggests determining a placement of components in a rack by solving an optimization problem using a computer, as is recited in applicants' claim 1. Rather, Cook teaches that components are simply placed in a rack and that a computer system strictly enforces rules regarding the placement. The difference is that Cook teaches a rules-based system (also known as an "expert system"). Such rules-based or expert systems attempt to encode knowledge of a human expert into a set of rules which can be applied by a computer system. In contrast, solving the optimization problem as in applicants' claim 1 involves receiving decision variables and constraints as input, finding a solution (i.e. a placement) and then evaluating the solution against objectives. These are two entirely distinct design approaches. This difference is apparent when one considers that Cook requires that the user first make a placement selection and then the computer of Cook applies rules to that selection, whereas, the

optimization problem solution of claim 1 does not require placement selections on the part of a user. Kolen does not teach anything about solving an optimization problem using a computer. Accordingly, Kolen does not teach this feature either. For at least this reason, claim 1 is allowable over Cook and Kolen, taken singly or in combination.

Further, neither Cook, nor Kolen, teaches or suggests determining a placement of the components in the rack by taking into account the height and weight for each component and then evaluating the placement of the components according to a center of gravity objective. Cook teaches that components are simply sorted by weight with the heaviest relegated to the bottom of the rack. Rather than always placing the heaviest component at the bottom of the rack according to the rules-based system of Cook, applicants' invention as recited in claim 1 determines whether a more optimal solution with respect to the center of gravity could be achieved by a different placement. For example, if several components of moderate weight, but short height, are placed below a heavy component of relatively tall height, this placement may result in a lower center of gravity than an alternative placement in which the tall, heavy component is placed at the bottom of the rack. The applicants' invention would be able to arrive at the placement with the lower center of gravity, whereas, the system of Cook would not. Kolen does not teach anything about taking into account a center of gravity. Therefore, this is another reason why applicants' claim 1 is allowable over Cook at Kolen, taken singly or in combination.

Claims 2-13, 16-19 are allowable at least because each depends from an allowable base claim 1. Further, these dependent claims recite limitations not taught or suggested by Cook or Kolen. For example, claims 4 and 5 recite relaxing a particular constraint and determining placement according to remaining constraints. The office action relies on passages of Cook and Kolen as teaching the limitations of claim 4. However, the passage of Cook at col. 8, lines 39-41, merely teaches that components are repeatedly selected and placed in the rack, while the passage of Kolen at page 157 merely teaches that the system was designed under constraints that the construction be simple and inexpensive, that it accommodate a large number of processors, that it provide easy access to the processing units and that it be mobile. As another example, claim 6 recites providing a weight distribution for each component. While Cook refers to weight of components, it

does not teach anything about weight *distribution.* Clearly, the plain meaning of *weight distribution* is different from that of *weight* since both are separately discussed in the applicants specification and recited in applicants' claims. See applicants' specification at page 6, lines 1-3 and lines 16-20. As further examples, claims 7 and 8 recite specifics of the objectives relating the center of gravity against which the placement is evaluated. However, as explained above in connection with claim 1, Cook merely sorts components according to weight with the heaviest relegated to the bottom of the rack. These are additional reasons why these dependent claims are allowable.

Similarly to claim 1, independent claim 23 is amended to require the use of a computer to solve an optimization problem. Moreover, the solution takes into account the height and weight of each component and evaluates the placement against a center of gravity objective. As explained above in connection with applicants' claim 1, Cook and Kolen, taken singly or in combination, do not teach or suggest these features. For at least these reasons, claim 23 is allowable over Cook and Kolen. In addition, claim 23 recites taking into consideration weight distribution. As explained above in connection with claim 6, Cook refers to weight of components, it does not teach anything about weight *distribution.* Therefore, this is additional reason why claim 23 is allowable.

Independent claim 24 recites a computer readable memory comprising computer code for directing a computer to make a determination of placement of components in a rack, the determination of the placement of the components comprising the steps recited in claim 1. Therefore, claim 24 is allowable over Cook and Kolen for at least the same reasons that claim 1 is allowable. Claims 25-30 are allowable at least because each depends from an allowable base claim 24. Further, these dependent claims recite limitations that are not taught or suggested by Cook or Kolen. For example, claims 26 and 27 recite relaxing a particular constraint and determining placement according to remaining constraints. As another example, claim 28 recites providing a weight *distribution* for each component. As further examples, claims 29 and 30 recite specifics of the objectives relating the center of gravity against which the placement is evaluated. These are additional reasons why these dependent claims are allowable.

Independent claim 33 recites a computer readable memory comprising computer code for directing a computer to make a determination of placement of components in a

rack, the determination of the placement of the components comprising the steps recited in claim 23. Therefore, claim 33 is allowable over Cook and Kolen for at least the same reasons that claim 23 is allowable.

The rejections of dependent claims 14, 15, 20-22, 31 and 32 have their basis in the rejections of claims 1 and 24 from which they depend. As explained above, claims 1 and 24 are allowable. Therefore, claims 14, 15, 20-22, 31 and 32 are allowable at least because each depends from an allowable base claim 1 or 24.

As a separate and independent basis for overcoming the rejections of claims 1-33, the applicants respectfully submit that the Cook and Kolen references are not properly combinable. As explained in the Manual of Patent Examining Procedure, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. MPEP at Section 2143 (Aug. 2006). As explained above, Cook relates to a rule-based system for selecting and loading components of a person computer system into rack. In contrast, Kolen describes construction of a mounting system for a computer cluster using a wooden frame and standard shelving hardware. The system of Kolen was clearly designed specifically for an experimental computer cluster to be used by researchers in a laboratory and was not intended for mass use or production. See Kolen at page 158. In contrast, the system of Cook is designed for mass use by persons of low sophistication in computer systems for almost any business, large or small, that uses a computer based network. See Cook at col. 2, lines 50-58. Further, Cook is directed toward selection and placement of rack-mountable components in a standard rack. This is clear because Cook does not discuss the rack itself except to mention the existence of such racks in its background. See Cook at col. 1, lines 25-37. In contrast, Kolen is directed toward construction of an entirely different type of rack to which motherboards without housings were fastened. See Kolen at page 158. In view of these differences, there would not have been a motivation to combine the Cook and Kolen references in the manner suggested in the office action.

Further, Waldon is directed toward mathematical modeling. Abstract of Waldon. Waldon explains that it is tedious and time consuming to manually vary the input parameters of a mathematical model since there may be thousands, millions or more

possible variations of input parameters to a given mathematical model. Waldon at col. 1, lines 56-59. As such, Waldon explains that it is not practical for a human designer to manually vary the different parameters of many modern-day mathematical models. Waldon at col. 1, lines 59-61. As example, Waldon explains that a mathematical model of an I-beam, such as used in building construction, may have fixed input variables and several of parameters that can be varied. See Waldon at col. 1, lines 37-55.

As a solution to the problem of needing to explore so many variable parameters, Waldon teaches a directed heuristic search (DHS) for an optimization design system. Waldon at col. 5, lines 15-16. Waldon further explains in its Abstract that the DHS directs a design optimization process that implements a user's selections and directions, the order and directions in which the search for an optimal design is to be conducted, and how the search is to sequence through potential design solutions. In addition, Waldon explains that DHS is tractable, in that it records a log of the sequence of design solutions that were evaluated during a particular design optimization search. The user may review this search log, to understand how and why the DHS made design optimization decisions. According to Waldon, a user may change search parameter settings in a user-defined dependency to change future search patterns for optimal designs. See Abstract of Waldon.

Clearly, the mathematical models to which Waldon is directed are complex since they are said to have thousands, millions or more possible variations of input parameters. As explained above, the system of Cook is a rule-based system for selecting and loading a limited number of components of a personal computer system into rack. As also explained above, Kolen describes construction of mounting system for a computer cluster using a wooden frame and standard shelving hardware to which motherboards are fastened. Therefore, Waldon, Cook and Kolen each solves a problem that is unrelated to the problems solved by the others. In view of the differences among Waldon, Cook and Kolen, there would not have been a motivation to combine them in the manner suggested in the office action.

These are additional reasons why applicants' claims 1-33 are allowable over Cook, Kolen and Waldon.

Conclusion:

In view of the above, the applicants submit that all of the pending claims are now allowable. Allowance at an early date would be greatly appreciated. Should any outstanding issues remain, the examiner is encouraged to contact the undersigned at (408) 293-9000 so that any such issues can be expeditiously resolved.

Respectfully Submitted,

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